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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/065,486

10/23/2002

Tin-Su Pan

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23413 7590 04/23/2008  
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EXAMINER

LAMPRECHT, JOEL

ART UNIT

PAPER NUMBER

3737

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/065,486	<b>Applicant(s)</b> PAN ET AL.	
	<b>Examiner</b> JOEL M. LAMPRECHT	<b>Art Unit</b> 3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-11, 13-17 and 21-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-11, 13-17, 21-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Drawings***

The drawings, filed 12/02 are objected to because they are not labeled as "Replacement Sheets". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. *Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).* If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Objections***

Claims 1-3, 5-11, 13-17 and 21-31 are objected to because of the following informalities: Regarding claim 1, Lines 12-13 should read "each of said sub-target areas". Regarding claim 2, "said" sub-target area lacks antecedent basis and should read "each of said sub-target areas". Regarding claim 9, lines 16 and 17 should read

"each of said sub-target areas". Regarding claim 10, "said sub-target area" lacks antecedent basis and should read "each of said sub-target areas". Regarding claims 10, 11, 13 and 14 it is unclear exactly what further structural limitation has been set forth. Regarding claims 16 and 17 it is unclear how the computer program as recited would be different from the code set forth in claim 15. Regarding claim 21, line 12, "said imaging system" lacks antecedent basis as it is only inferentially set forth in the preamble and has not been positively recited as part of the claimed invention. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5, 16, and 22 are rejected under 35 U.S.C. 112, second paragraph, as all contain a broader limitation than the claims from which they depend. In the instant case the term "physiological cycle" is broader than the "breathing cycle" disclosed in the independent claims from which they depend and therefore fail to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5-7, 9-11, 13-16, 21, 22, 24, 26, 27, and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eisenberg et al (US 2003/0128801 A1) in view of Barni (US 6,473,634 B1). Eisenberg et al discloses and teaches a method and system for static and dynamic image acquisition based on gated responses and a method for processing of acquired images including the acquisition of planar data having detector coverage in an axial direction defined by the motion of a gantry (0088), the acquisition of an image of a target area including the acquisition of data in a plurality of sub-target areas corresponding to individual detector elements (Figure 12, 3-8, 0060, 0069-0078 (Specifically 0077-0078), 0080), and the combination of data into a synchronized image based on the acquisition data from specific times during physiological cycles including the breathing cycle (Claim 20, 0054-0059, 0065, 0088-0089, 0109, 0111, 0117-0120), computing an acquisition time through the use of physiological monitoring (0088-0089, 0107-0121), collecting imaging data which is attenuated based on frequency and combined to produce a set of image data of the

entire area of interest (0078, 0102, 0105-0106, 0118). The physiological gating process is controlled by a controller to allow for flexibility in the acquisition of image data corresponding to factors of the physiological cycle and gantry rotation/translation (0109, 0111, 0116-0118, 0054, 0058, 0065), and the phase of the physiological cycle is used to correlate the image data into synchronized data which entails an asynchronous scan mode with PET scan data (0116, 0113, 0108, 0107, 0057-0065).

The Examiner has interpreted Claim 21 as means plus function language, thus invoking the sixth paragraph of 35 U.S.C. 112, and the Examiner has looked to the specification for a description of the structure claimed. Although Eisenberg et al does not provide the exact structure described in the specification, it is a functional equivalent because it serves the same purpose of determining target areas and sub-target areas of interest, imaging the areas, combining and processing the image data and synchronizing the data, and it achieves the same result of registering images of a patient using retrospective gating.

Eisenberg et al disclose all that is listed above including frequency domain synchronization via frequency data collection, but do not specifically mention the "phase" of the data, rather the phase of the acquisition is taught, although it is not mentioned as "phase" but rather the correct timing during the physiological cycle. Retrospective gating is based on the data, rather than the acquisition and attention is then directed to Barni which explicitly teaches image data acquisitions at specific phases or times during the physiological cycle using retrospective gating (Col 4 Line 25- Col 5 Line 25) where retrospective gating combines data from specific times in the physiological cycle. Additionally, although Eisenberg et al do not explicitly designate

acquisition for 2/3rds of a gantry rotation or one gantry rotation plus a physiological cycle, it would have been obvious to one of ordinary skill in the art to have used the control systems of Eisenberg et al to perform such a method as a dynamic control system is disclosed and referenced above allowing for variable acquisitions of image data. It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the phase gated techniques of Barni with the time gated techniques of Eisenberg et al due to the fact that phase and time are analogously related processes within a cyclical physiological cycle.

Claims 8, 17 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eisenberg et al (US 2003/0128801 A1) in view of Barni (US 6,473,634 B1) as applied to claims 1, 15, and 21 and in further view of Shao et al. (U.S. Patent Application Publication No. 2003/0233039). Eisenberg et al in view of Barni teaches all of the features of the present invention except for expressly disclosing that the PET emission data is synchronized with the phase. There is a gating process disclosed within Eisenberg based on the time dependent signal acquisition, but the "phase" of the data is not explicitly discussed (0053 and more as disclosed and referenced above). In the same field of endeavor, Shao et al. teaches matching PET data to the respiration phase of a subject being imaged (paras. 10, 48 and 68). It would have been obvious to one of ordinary skill in the art at the time of the invention to synchronize the PET data with the phase of Eisenberg et al in view of Barni in order to improve the alignment of the images.

Claims 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eisenberg et al in view of Barni as applied to claim 24 above and in further view of Hu et al. (U.S. Patent No. 6,073,041).

Eisenberg et al in view of Barni teaches all of the features of the present invention, including determining a reference point in the data (col. 4, lines 66-67 and col. 5, lines 1-60, Barni), except for expressly disclosing that a phase of zero was assigned to the reference point and a phase of  $2\pi$  was assigned to a subsequent reference point, where the synchronizing included selecting images' with corresponding phases and that the phase was adjusted when the reference point occurred when the imaging system was not active. In the same field of endeavor, Hu et al. teaches a system for retrospective gating of images using an assigned phase based on the respiratory cycle, where subsequent reference points were also assigned a phase, in order to register the images, where the phase was adjusted when the reference point occurred when the imaging system was not active (col. 6, lines 58-67, col. 7, lines 1-67, col. 8, lines 1-56, col. 11, lines 10-67 and col. 12, lines 1- 14). Although the particular phase values of zero and  $2\pi$  were not specifically taught, Hu et al. does teach periodic cycles, thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have used such values to characterize the periodicity of the phases assigned.

### ***Response to Arguments***

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.



***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL M. LAMPRECHT whose telephone number is (571)272-3250. The examiner can normally be reached on Monday-Friday 8:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571)272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ruth S. Smith/  
Primary Examiner, Art Unit 3737

JML